REMARKS

Claims 1-20 will be pending upon entry of the present amendment. Claims 8, 10, and 11 are being amended to use U.S. spellings. Claim 20 is new. No new matter is presented.

Claims 1-2, 4-5, 7-8, 10, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by UK Patent Application 2 208 774 to Morgan et al. ("Morgan").

Morgan does not disclose the invention recited in claim 1. Claim 1 recites a motion estimation method that includes:

> determining a primary global motion vector for the selected group from all of the corresponding block motion vectors;
>
> classifying the block motion vectors from the selected group into a plurality of sub-groups;
>
> determining a plurality of secondary global motion vectors corresponding to the respective sub-groups from the block motion vectors classified in the respective sub-groups.

Morgan does not disclose the step determining a primary global motion vector. Instead, Morgan computes a respective motion vector for each block of an image field, and then determines from a set of tests which of the motion vector are global motion vectors (p. 10, lines 10-16). Morgan does not determine which of the global motion vectors is a primary global motion vector. Morgan does rank the motion vectors in order of decreasing frequency (p. 10, lines 14-15, but the motion vector with the highest frequency doesn't necessarily even become a global motion vector, let alone a primary global motion vector. The "frequency" test is only one test of several for determining whether a motion vector becomes a global motion vector, and thus, being ranked highest on one test means nothing to Morgan. In addition, all of the motion vectors that pass all of the tests simply become global motion vectors, with no distinction being made between "primary" and "secondary" global motion vectors.

Morgan also does not disclose the step of determining a plurality of secondary global motion vectors corresponding to the respective sub-groups from the block motion vectors classified in the respective sub-groups. As discussed above, Morgan simply determines which

motion vectors pass the tests for becoming global motion vectors. Thus, the only "sub-groups" in Morgan are the group of global motion vectors ("global MV group")and the group of motion vectors that did not become global motion vectors ("non-global MV group"). Morgan never determines a secondary global motion vector from the motion vectors in the global MV group. Instead, Morgan simply outputs all of the global motion vectors in the global MV group to a motion vector selector 230 (p. 10, lines 16-26). In addition, Morgan certainly does not determine a secondary global motion vector, corresponding to non-global MV group, from the motion vectors in the non-global MV group. Instead, the motion vectors in the non-global MV group are only used by the motion vector selector 230 for those pixels in the blocks (and neighboring blocks) corresponding to the motion vectors in the non-global MV group (p. 10, lines 19-25)

For the foregoing reasons, claim 1 is not anticipated by Morgan.

Claims 2, 4-5, and 7 depend on claim 1, and thus, are also not anticipated by Morgan. In addition, claim 7 recites additional features not disclosed by Morgan. Claim 7 recites "selecting and performing one of a plurality of motion estimation and search schemes based on selected characteristics of the primary and secondary global motion vectors, the plurality of motion estimation and search schemes employing various combinations of the global motion vectors and matching-block search window schemes." First, as discussed above, Morgan does not determine primary and secondary global motion vectors, and thus, cannot disclose such selecting and performing based on selected characteristics of the primary and secondary global motion vectors.

Second, Morgan does not disclose plural motion estimation and search schemes or any selection between such schemes. Instead, Morgan discloses only a single motion estimation and search scheme in which a block matcher 190 calculates correlation surfaces representing spatial correlation between blocks of two input fields, a correlation surface processor 200 generates interpolated correlation surfaces, and a motion vector estimator 210 that detects points of greatest correlation in the interpolated correlation surfaces (p. 9, lines 4-12). Morgan is not specific as to how the block matcher 190, correlation surface processor 200, and motion estimator 210 perform searching to estimate the motion vectors, but nowhere suggests that the searching is varied in any way or that there is any selection between plural searching schemes.

The applicants disagree with the Examiner's assertion that page 10, line 26 to page 11, line 8; page 12, line 31 to page 13, line 8; and page 16, lines 25-28 disclose the elements of claim 1. None of those sections disclose any selection between plural motion estimation and search schemes. The section on pages 10-11 describes the operation of the motion vector selector 230, which receives two input fields and the previously determined motion vectors, and supplies an output that includes one motion vector per pixel. Rather than selecting between plural motion estimation and search schemes having different combinations of global motion vectors and matching-block search window schemes, the motion vector selector 230 simply selects one motion vector for each pixel from the previously determined motion vectors. The sections of Morgan on pages 12-13 and 16, and substantially the rest of Morgan, are directed to steps used by the motion vector reducer 220 to determine which of the previously-determined motion vectors should be classified as global motion vectors. Again, such steps do not select between schemes having different combinations of global motion vectors and matching-block search window schemes.

For the foregoing reasons, claim 7 is not anticipated by Morgan.

Morgan does not disclose the invention recited in claim 8, which recites a motion estimation method that includes:

> determining a plurality of global motion vectors for the selected group, each of the global motion vectors being formed from a plurality of the corresponding block motion vectors;
>
> analyzing the global motion vectors and determining a metric representing a distribution pattern thereof; and
>
> selecting a motion estimator scheme on the basis of the distribution pattern metric, the motion estimator scheme being selected from amongst a plurality of motion estimator schemes each having a different combination of search strategy and number of global motion vectors.

Morgan does not disclose the determining step of claim 8. Although Morgan does disclose determining a plurality of global motion vectors, none of the global motion vectors are "formed from a plurality of the corresponding block motion vectors." Instead of being formed

from plural block motion vectors, such as by averaging, each global motion vectors is simply a block motion vectors that passed the tests for being selected as a global motion vector.

Morgan also does not select a motion estimator scheme from amongst plural motion estimator schemes each having a different combination of search strategy and number of global motion vectors. As discussed above with respect to claim 7, Morgan uses only a single search strategy, and thus, cannot suggest the selecting step of claim 8.

For the foregoing reasons, claim 8 is not anticipated by Morgan.

Claim 16 depends on claim 8, and thus, is not anticipated by Morgan. In addition, claim 16 recites that the determining step includes "classifying the block motion vectors from the selected group into a plurality of sub-groups; and determining a plurality of secondary global motion vectors corresponding to the respective sub-groups from the block motion vectors classified in the respective sub-groups." As discussed above with respect to claim 1, Morgan does not determine any secondary global motion vectors from block motion vectors in respective sub-groups. Accordingly, claim 16 is not anticipated by Morgan.

Although the language of claim 10 is not identical to that of claims 1 and 8, the allowability of claim 10 will be apparent in view of the above discussion.

Claim 3 was rejected under 35 U.S.C. § 103 as being unpatentable over Morgan.

Morgan does not teach or suggest the invention recited in claim 3, which depends on claim 1. First, Morgan does not suggest any of the features of claim 1 that are discussed above. Second, Morgan does not teach or suggest the features added in claim 3 which recites that the primary and secondary global motion vectors are computed from an average of the block motion vectors within the respective corresponding group or sub-group. The Examiner takes Office Notice that averaging is a well-known metric, but that does not make it obvious to use averages to compute a primary vector for a group of motion vectors and secondary vectors for sub-groups of vectors. Nothing in Morgan suggests the use of any representative metric to represent any group of motion vectors, so one would not be motivated to use an averaging metric. Also, for the non-global MV sub-group, Morgan does not suggest determining any secondary global motion vector, and thus, cannot suggest using averaging to determine such a secondary global motion vector.

The applicants also disagree with the Examiner's assertion that averaging would "more accurately represent the motion vector candidate group." The Examiner does not provide any support for such an assertion. In fact, using an average global motion vector would seem less accurate than the actual global motion vectors selected by the vector selector 230 of Morgan.

For the foregoing reasons, claim 3 is nonobvious in view of Morgan.

The Examiner rejected claims 6, 9, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Morgan in view of U.S. Patent No. 5,428,396 to Yagasaki et al. ("Yagasaki"); claims 11-12 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Morgan in view of U.S. Patent No. 6,249,550 to Mizuno et al. ("Mizuno"); and claims 13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Morgan in view Yagasaki and Mizuno.

Morgan and Yagasaki do not teach or suggest the invention recited in claim 6, which depends on claim 1, and claims 9 and 16, which depend on claim 8. Yagasaki does not teach or suggest the features of claim 1 and 8 that are discussed above as missing from Morgan. Accordingly, claims 6, 9, and 17 are nonobvious in view of Morgan and Yagasaki.

Morgan and Mizuno do not teach or suggest the invention recited in claim 11. Claim 11 recites an encoder that includes:

> a global motion estimator …, each global motion vector being generated from a plurality of block motion vectors from a respective group of related blocks in the picture;
>
> a motion characteristics analyzer … to determine a metric representing a distribution pattern thereof;
>
> a selector coupled … for selecting a motion estimation scheme from amongst a plurality of motion estimation schemes …; and
>
> a plurality of motion estimators … for performing data block matching of at least one subsequent picture in the sequence using the selected motion estimation scheme ….

Morgan and Mizuno do not teach or suggest the global motion estimator, the selector, or the plurality of motion estimators. As discussed above with respect to claim 8, Morgan does not teach or suggest generating a global motion vector from plural block motion

vectors of a group of related blocks in the picture. Similarly, Mizuno also does not generate any global motion vector from plural block motion vectors. The Examiner points to Figure 11 and col. 18, line 63 to col. 19, line 43 of Mizuno as showing two motion estimators, but that section of Mizuno discusses four minimum value detecting circuits 132-135 operating in parallel. Such parallel operation does not suggest a selection between plural motion estimation schemes or plural motion estimators for matching a subsequent picture using a selected motion estimation scheme.

Accordingly, claims 11-2 and 14 are nonobvious in view of the cited prior art.

Claims 13-15 depend on claim 11, and thus, are not taught or suggested by Morgan and Mizuno. In addition, Yakasaki does not teach or suggest the features of claim 11 that are missing from Morgan and Mizuno. Accordingly, claims 13-15 are nonobvious in view of the cited prior art.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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